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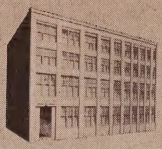

Subsidiary
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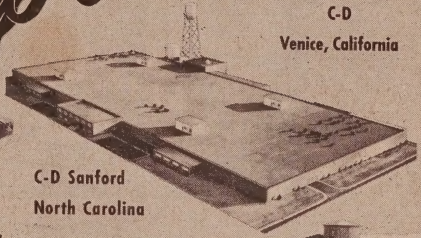
Cleveland, Ohio

C-D
Venice, California



C-D Sanford
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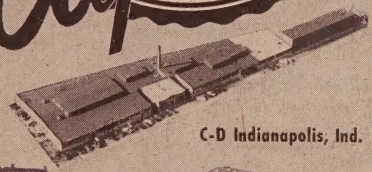

C-D Indianapolis, Ind.

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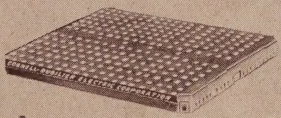

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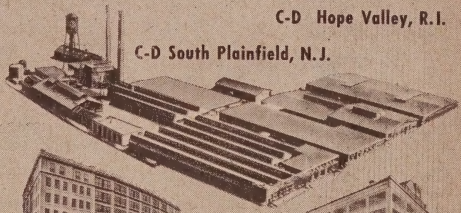

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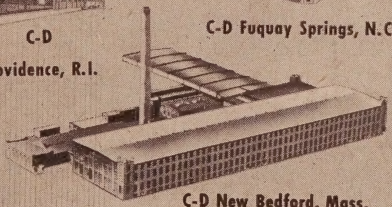

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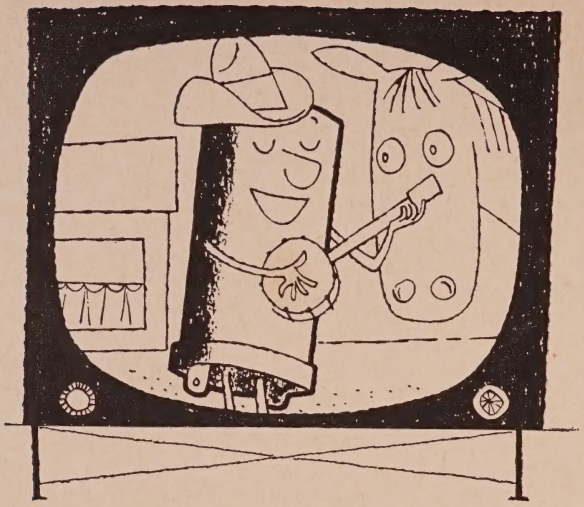

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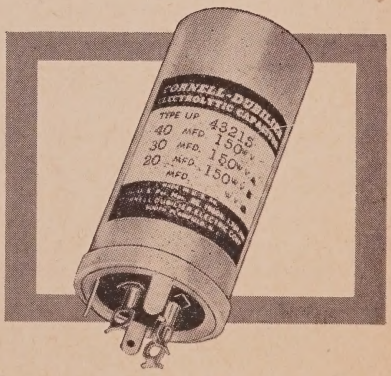

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R-F MEASUREMENTS WITH THE OSCILLOSCOPE

It is well known that the oscilloscope speeds and simplifies many audio- and intermediate-frequency tests. Not as well exploited, however, is the usefulness of the scope in radio-frequency measurements.

Within the last three years, the vertical-channel band-width of low-priced oscilloscopes available to the experimenter and service technician has been extended to 3, 4, and 5 megacycles, and the sweep frequency to 500 or 600 kc. Expensive, laboratory-type scopes, of course, have had these features for a longer time and engineers readily have utilized these capabilities to observe r-f phenomena.

The improved performance of the new service-type scopes enables the experimenter to make certain visual r-f measurements for the first time. This new tool offers speed and certainty in certain measurements usually subject to misinterpretation when made by indirect methods.

Waveform Display

The direct examination of i-f and r-f waveforms is an advantage enjoyed only with a wide-band scope. The ability to examine directly radio-frequency waveforms is of aid both in design and troubleshooting.

The lowest number of cycles at a given signal frequency that may be displayed on the screen depends upon the sweep frequency range. For example, a maximum sweep frequency of 500 kc enables a single cycle to be obtained only for a signal frequency of 500 kc, 2 cycles of 1 Mc, 4 cycles of 2 Mc, 6 of 3 Mc, 8 of 4 Mc, and 10 of 5 Mc. Beyond 10 cycles, observation becomes difficult unless the scope is provided with expanded sweep or a sweep magnifier. A single cycle is obtainable, of course, at all frequencies lower than the 500-kc signal frequency of the preceding example simply by setting the sweep frequency equal to the signal frequency.

The conventional technique is followed in r-f waveform observation. Apply the test signal to the vertical amplifier input and set the controls for internal sweep and internal sync. Adjust the sweep and sync controls for a stationary display of the desired number of cycles. A low-capacitance input probe usually will be required to minimize loading or de-tuning of the signal source (See Figure 1A) or a 1- to 2-turn pickup coil (Figure 1B) may be used for inductive coupling to the signal tank.

High-frequency waveforms may be examined for purity, normal modulation, extraneous modulation, noise, amplitude, and drift or fluctuation of amplitude or frequency.

What is desired in purity depends upon the application. For example, the output of a 100-kc standard-frequency oscillator should not be sinusoidal, since high-order harmonics are required in the use of this oscillator for calibrations. Amplitude modulation, whether normal or extraneous, causes a broadening of the peaks of the high-frequency wave. Hum produces a type of extraneous amplitude modulation. This thickening of the

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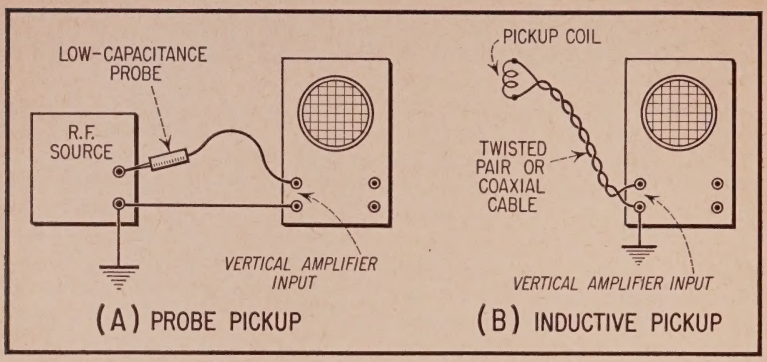


Fig. 1. Connections for Wave Patterns.

peaks is stationary and patterned in steady modulation but is ragged, irregular, and intermittent when due to noise. Frequency drift or flutter is evidenced by a shifting of the pattern along the horizontal axis; amplitude drift or flutter by movement along the vertical axis.

Frequency Comparison

Lissajou figures may be used to check one radio frequency in terms of another in the same manner that audio frequencies ordinarily are compared.

The unknown radio frequency is applied to the vertical amplifier input terminals of the scope when it is not beyond the frequency range of the vertical channel. The known frequency is applied to the horizontal amplifier input, if this frequency is within the frequency limits of the horizontal channel, or directly to the horizontal deflection plates if the known frequency is higher. Figure 2 shows the patterns obtained for several relationships between the known frequency (f_1) and unknown frequency (f_2).

The scheme for frequency identification is to count the number of loops in the figure and to divide the standard (known) frequency by this number if the pattern is vertical (A, B, C) or to multiply by this number if the pattern is horizontal (D, E, F, G). The

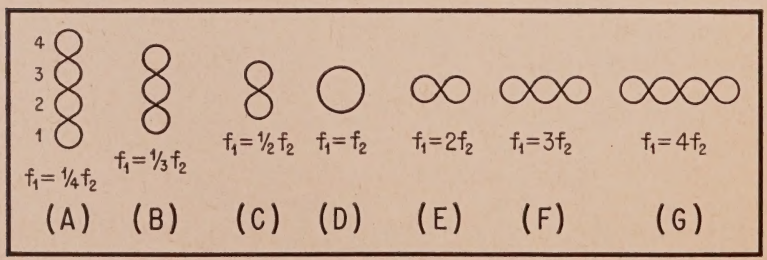


Fig. 2. Lissajou Figures for Radio Frequency Comparison.

practical limits of this method are approximately $f_1 = 0.1f_2$ to $f_1 = 10f_2$, since it is difficult to count more than ten loops on the average scope screen.

The Editors have used this method to check the operation of frequency doublers, triplers, and quadruplers in radio transmitters. Signal f_2 was picked up by means of a small coil (as in Figure 1B), coupled to the oscillator or buffer stage operating on the lowest or fundamental frequency, and applied **directly** to the horizontal deflection plates of the scope. Signal f_1 was picked up from the multiplier stage also by means of a small coupling coil, and applied directly to the vertical deflection plates. The pattern shown in Figure 2(E) was obtained with a normally-operating doubler stage, 2F for a tripler, and 2G for a quadrupler. Thus, a doubler which accidentally is tripling is easily spotted.

The Editors have employed this method successfully in transmitter testing at frequencies up to 30 megacycles. An important point is that a conventional scope is entirely satisfactory for this measurement, provided the signals are applied directly to the deflection plates. A wide-band scope is not essential.

Null Detection

The wide-band oscilloscope may be employed as a null detector for use with a radio-frequency bridge, T-network, or other null-type r-f impedance-measuring instrument. Such bridges usually operate at a test signal frequency of 1000 kc.

The bridge detector terminals are connected to the vertical amplifier input terminals of the scope. If the internal sweep is operated, a sine-wave pattern is obtained when the bridge is unbalanced, and a straight, horizontal line trace at complete null. If the internal sweep is switched off, a straight, vertical line is obtained for unbalance and a dot at complete null.

Maximum sensitivity depends upon the model and manufacture of the scope. In low-cost instruments, it usually is of the order of 25 millivolts rms per inch deflection.

R-F Signal Tracing

The wide-band service-type oscilloscope may be used directly for signal

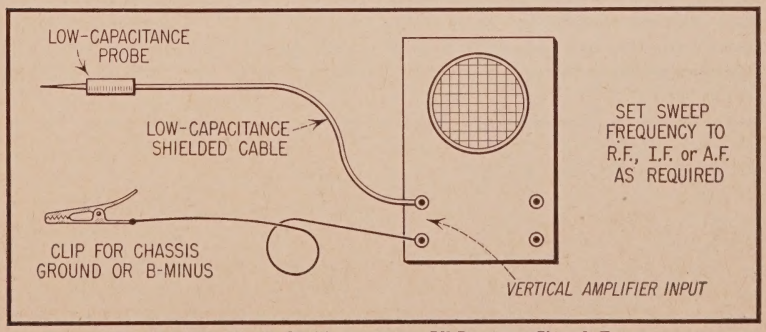

LOW-CAPACITANCE PROBE
LOW-CAPACITANCE SHIELDED CABLE
CLIP FOR CHASSIS GROUND OR B-MINUS
SET SWEEP FREQUENCY TO R.F., I.F. or A.F. AS REQUIRED
VERTICAL AMPLIFIER INPUT

Fig. 3. Wide-Band Oscilloscope as All-Purpose Signal Tracer.

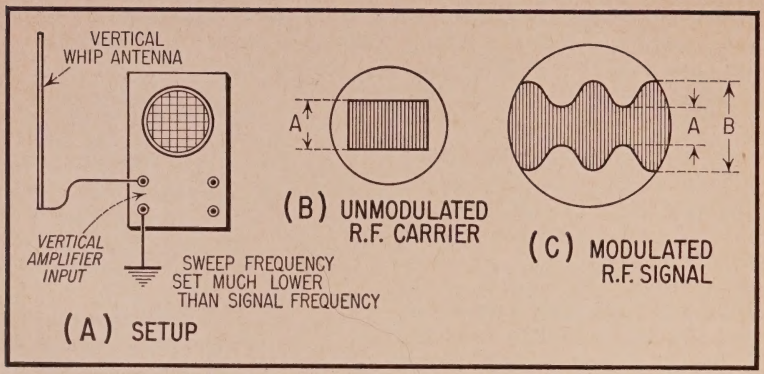


Fig. 4. Amplitude Modulation Monitoring.

tracing in **all** of the stages of a superheterodyne receiver operated at signal frequencies up to 5 or 10 megacycles.

The "hot" vertical amplifier input terminal is provided with a low-capacitance test probe on the end of a shielded, low-capacitance cable, as shown in Figure 3, to minimize loading of the circuit under test. The receiver input is connected to an amplitude-modulated signal generator, and the receiver tuned to the generator frequency.

The signal is traced through the receiver, from antenna to loudspeaker voice coil, by transferring the pickup probe from one key test point to the next progressively through the receiver. The scope sweep frequency is shifted as required, to keep a series of cycles on the screen as the signal frequency changes from rf, through if, to af.

As a signal tracer, the wide-band oscilloscope has the advantages that it displays actual signal waveforms in any circuit of the receiver, as well as their amplitudes; and shows any extraneous products, such as hum, chance modulation, noise, and oscillation, which might arise in addition to the desired signal.

Amplitude Modulation Metering

Amplitude modulation may be checked with the wide-band scope

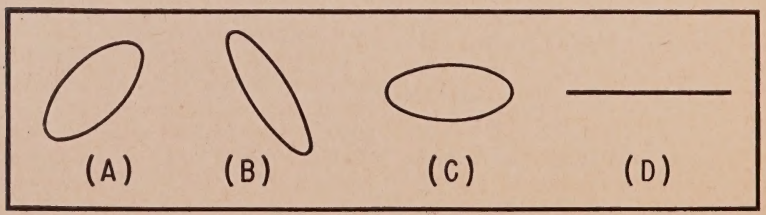


Fig. 5. Transmitter Neutralization Patterns.

without the intermediary of direct connections to either the r-f or a-f channels of the transmitter, provided the carrier frequency is within the pass band of the scope vertical amplifier. The sensitivity of the oscilloscope is high enough to enable satisfactory operation without close coupling to the transmitter. No intermediate detector is needed.

Figure 4(A) shows the connections. A whip antenna or short, vertical rod is connected to the "hot" vertical amplifier input terminal to pick up the modulated r-f signal. The common terminal is grounded solidly.

When the scope sweep frequency is set to a value considerably lower than that of the r-f carrier, say to 1/10 of the carrier, a wide band having a peak-to-peak amplitude **A** is obtained on the screen, as shown in Figure 4(B), for the unmodulated carrier. When the carrier is modulated, the pattern in Figure 4(C) appears, with modulated peak-to-peak amplitude **B**. The modulation percentage equals 100 (B–A)/B+A. The amplitudes, A and B, may be measured in inches, centimeters, or scale divisions.

The setup of Figure 4(A) usually will provide sufficient signal pickup. Where a signal boost is required, however, a parallel-resonant circuit, tuned to the carrier frequency, may be added between the two vertical amplifier input terminals. This scheme has been used with the rod antenna to observe the modulation of a local broadcast station more than 10 miles distant.

The modulated output of an AM test oscillator or signal generator may be checked with the oscilloscope by dispensing with the pickup antenna and feeding the oscillator signal into the vertical amplifier directly.

Figure 6 shows how the oscilloscope may be connected for amplitude-modulation measurements on a received signal. The internal sweep of the scope is switched off. The scope is connected to the i-f channel of the receiver, through the 0.25-ufd coupling capacitor, through the shortest possible leads.

Figure 7 shows the patterns obtained with this setup. When the signal is unmodulated, a sharp-lined circle representing the carrier is obtained. (See Figure 7A). As the signal is modulated, the circle swells both inwardly and outwardly, expanding out to D and in to B to give a doughnut or washer pattern. When the signal is 100% modulated, this pattern neatly closes the center hole, as shown in Figure 7(C). When the signal is overmodulated, the resulting "lap-over" of the pattern causes a bright

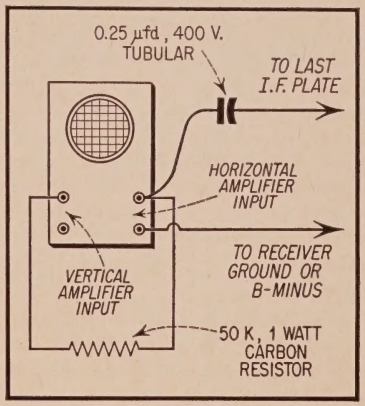


Fig. 6. Connections for Amplitude-Modulation Measurements on Received Signal.

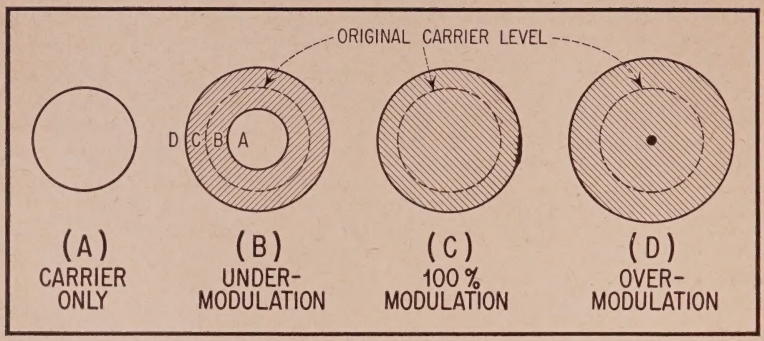


Fig. 7. Received-Signal Modulation Patterns.

spot to appear at the center of the disc, as shown in Figure 7(D).

Modulation percentage may be determined by measuring the distances vertically or horizontally on the pattern. Referring to Figure 7(B): Positive peak modulation (in percent) = 100 (AD–AC)/AC. Negative peak modulation (in percent) = 100 (AC–AB)/AC.

Neutralization Indicator

When provided with a small pickup coil on the end of a low-capacitance, shielded cable, as in Figure 1(B), the wide-band oscilloscope makes a sensitive neutralization or parasitic indicator for use in radio transmitter adjustment. The carrier frequency must be within the pass band of the scope vertical amplifier.

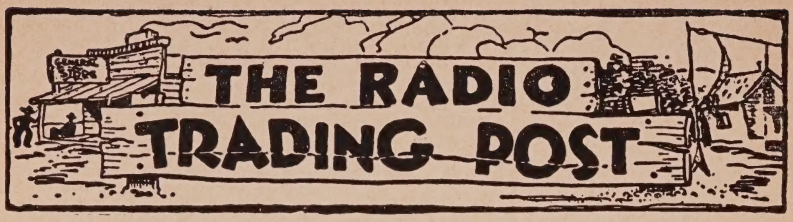
Either cyclic patterns may be used with the aid of the internal sweep, or the sweep oscillator may be switched off and the straight, vertical line trace used.

In this application, the oscilloscope has several times the sensitivity of the lamps, thermocouple meters, and diode meters commonly employed in neutralization and parasitic chasing.

If the vertical amplifier will not accommodate the transmitter frequency, the pickup coil should be connected directly to the vertical deflection plates. However, the vertical sensitivity provided by the vertical amplifier will be lost.

Another scheme for using the scope in neutralization consists of coupling the grid of the tube to be neutralized to the vertical deflection plates, and the plate of the tube to the horizontal deflection plates. The coupling may be accomplished through small pickup coils, or 50-uufd fixed capacitors.

The resulting patterns are shown in Figure 5. The patterns in 5(A) and 5(B) show that the tube plate circuit is not in tune and that the stage also is not neutralized. Figure 5(C) shows that the plate circuit is tuned but the stage still not neutralized. Finally, the straight, horizontal line trace of Figure 5(D) indicates that the plate circuit is tuned and the stage neutralized.



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FOR SALE — Surplus schematic diagrams, BC-454, T-23/ARC-5, R-28/ARC-5, BC-348, BC-221, and others, 25c each postpaid. S. Consalvo, 4905 Roanne Drive, Washington 21, D. C.

SELL OR SWAP — Eico VTVM 221, for Kwik-test cap. tester. C. Kebler, 40 Dudley Dr., Bergenfield, N. J.

WANTED — Used air conditioner in working order. Have Eico 5" scope, Eico ohm and voltmeter, sig. gen., 10" Motorola Tel.; 50 old radio tubes, good cond. Ed McEvoy, 715 So. 7th St., Lindenhurst, Long Island, N. Y.

WANT — Small screen TV's, 7" or less, portables preferred, need not be operating, must be inexpensive ($10 or less). Ship via moving van at my expense. Mr. Blaine W. Penn, 6206 Thorn St., San Diego 15, Calif.

FOR SALE — Solar photo enlarger; unused Nikkor 135 mm telephoto and 50 mm f1.4 lenses. Will sell for $60, $100, and $110 respectively, or trade for mobile unit. Norman LaCroix, 392 Benefit Street, Pawtucket, R. I.

WANTED — FD-9 or FD-12 FM monitor; also, late model Hickok tube testers. Both must be in good cond. C. S. Damon, 4922 Wabash Ave., Kansas City, Mo.

WANTED — RCA KW modulation transformer; Amertran special transformer 6200 v. CT @ 750 ma.; Jap mike, AIWA-M18. Frank Huberman, Box 62, Sta. P, Brooklyn 12, N. Y.

SELL — Sams Photofacts, complete Vols. 1-11 inclusive, $125; Belfone 10 station intercom, $30. Harry Elrod, 731 Central Ave., Kansas City, Kan.

WANTED — 10 and 20 meter beams, rotator, tower. Must be a good buy. Robert Schacket, 135-30 232nd Street, Springfield Gardens 13, L. I., N. Y.

SELL OR SWAP — Complete DTI course on radio - TV - color TV — includes 5" scope, VOM, pwr. supply, and several clipboard projects (approx. 300), sacrifice at $100. All in A-1 cond. R. Banas, 10252 Avenue M, Chicago 17, Ill.

FOR SALE — Triplett VOM, model 666H, like new, $10. Charles Cerami, 146 Congress St., Newark, N. J.

SWAP OR SELL — AC generator power plant, 5 kw., 120 v., 60 cy., fully automatic, for late model Sun Distributor scope and cash or what have you. Eddie's Cadillac Service, 159 No. 6th St., Newark 7, N. J.

FOR SALE — BC-312N receiver, A-1 cond., make offer over $45. C. B. Kelley, 7204 Clovernook Ave., Cincinnati 31, Ohio.

SELL OR TRADE — Meissner disc recorder, radio, phono, PA, complete in portable case, like new. Need Viking II. Prefer local deal. J. Coffield, 1731 West First St., Brooklyn 23, N. Y.

WANTED — Used or new recording tape, any amount and any cond. Please give full details and price in first reply. R. Lackner, 2029 Bradley, Chicago 18, Ill.

WANTED — Used magnetic recording cartridges, FM chassis, 7F7, 6L6, 53 6SL7 & C7, output trans. 2-500 sec., 1½ and 6 v. rectifiers, wire or tape. Cash or trade tubes, Zim telephones, electric trains, cameras. L. Olson, 5734 Waring, Hollywood 38, Calif.

FOR SALE — National School correspondence course in Radio and TV, includes books and all parts, $80 or trade for ?? William Lamont, 2101 Adriatic Ave., Long Beach 10, Calif.

WANTED — Sams TV schematics, sig. gen., field strength meter. Jack Moser, R. 1, Lewisburg, Pa.

FOR SALE — Editions: 7, 9, 10, 12, 13 and 14 of ARRL handbook. All in very good cond., best offer. Herbert Greenberg, 821 Rutgers Rd., Franklin Square, N. Y.

WANTED — Small screen TV set, need not work. State size, price, and make. David Glover, 7909 Tances Dr., Madeira, Ohio.

FOR SALE — TV-Radio sales and service. Area just opening up to TV, potential good, some 2-way maintenance. Rinn's Studio, Yuma, Colo.

SELL OR TRADE — '52 Chev. car radio, manual tuning, $25; E-D VTVM, $30; Hammarlund 110 LXR, with supply, $75; Anchor booster, $10. Need 7" scope, videometer, cash, or make offer. John Pellock, 4110 Hillview Ave., Louisville, Ky.

WANTED — Hallicrafter SX42 receiver, good condition, low price. C. Horn, 325 E. 163rd St., New York 51, N. Y.

TRADE — Mallory UHF converter, model TV101, for 10" or larger K&E slide rule. William E. Warner, Rt. 3, Box 381, Charleston, W. Va.

FOR SALE — 100 copies QST, 1927 thru 1938, also few older copies; IRE Proceedings, 1922 thru 1938; misc. ham and service parts. Want UHF corner reflector antenna. E. Carter, 814 Craig Street, Schenectady 7, N. Y.

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FOR SALE — Precision multimeter in orig. carton, 20,000 ohms per v., 34 range, high sensitivity test set, $30. Vernon Blaine, Gary, S. D.

FOR SALE — Subraco 10 meter xmtr (mobile), SX-24 and NC-57B, all on the air at present. Warren Jarvis, 85-04 63rd Dr., Rego Park, Long Island, N. Y.

SELL — Good used TV booster, $5; and Meissner 8C tuner, perf., $20 prepaid. Jack's TV, Bedford, Iowa.

FOR SALE — 16" GE table model, 16T6, 20 tubes, rectangular picture, good condition, $34.95. Will ship anywhere. Jones Radio Co., 1115 Rambler Ave., Pottstown, Pa.

FOR SALE — HQ 129X and speaker, exc. cond., never removed from cabinet, $125. T. F. Dodd, 231 West 230th St., Bronx 63, N. Y.

SELL OR TRADE — Hallicrafters S-20-R, 1. n., Metermatic 25c coin meters. Want Jerrold AD03 or 10, Blonder-Tongue DA-8s, good sparker-rejuvenator for CRTs. H. Kettenbach, Rt. 2, Box 65, De Land, Fla.

WANTED — Vol. 1 and 2 of Surplus Conversion Manual, also GSAP 16 mm movie camera, battery case and lens. M. J. Douglas, 1401 Amodor, Concord, Calif.

WANTED — Harvey-Wells DPS-50 dynamotor power supply. Edward J. Daley, Peterson Rd., Rockville, Vernon Center, Conn.

WANTED — 200-400 w. final amplifier in operating cond., 10-80 meters, pi-net output, no plug in coils in grid or plate. Carl M. Lang, 6611 York Rd., Parma Hts. 30, Ohio.

TRADE — NRI Batt. sig. gen., VOM comb. and Dayton 3-tube probe, sig. tracer, for NC100 comm. rcvr. or equip, in working order. C. W. Bentley, Box 236, Talent, Ore.

WANTED — VHF-152A. Will pay cash for good equip. Have Sonar, XE10, $12, and Meissner sig. shifter, model 9-1090, 5 bands, $35 in A-1 cond. Cloyd's Radio Shop, 454 So. 3rd St., Hamilton, Ohio.

SELL — Dumont 3" scope model 164, $30; SX-42 with matching speaker, R-42, $170; unused Eldico transmitter, TR-75TV, $75; 6 v. battery eliminator, new rectifier, $20. Melvin Saur, Kent City, Mich.

WANTED — Light-duty mechanically operated relay switch that can be actuated by sound waves or by vibrations. Eugene F. Nowak, 1401 So Austin St., Brenham, Tex.

BUY OR TRADE FOR — Field strength meter RCA Senior voltomyst, Sprague Tel-ohmike capacitor tester, Precision test equip., 864 VOMA panel mount. F. Lovett, Newland, N. C.

WANTED — Used service data, tube lineup for Detrola radio, model 320, diagram and service data on Zenith radio, model 5S29, chassis 5513. O. L. Hart, 930 Pope, Independence, Mo.

WANTED — Good communications receiver for cash. W. Zuehlke, 3799 Medina Rd., Akron 13, Ohio.

SELL OR SWAP — Zenith hearing aids: A2A, needs phone batt., $3; A3AN-B3AN, working cond., $12. R. D. Smith, 420 East 105th St., New York 29, N. Y.

WANTED — Tape recorder, any make or model, state condition and price or will trade test equip., or what you want. I. Chipman, 2027 No. Park Ave., Tucson, Ariz.

SWAP — Riders Vol. 21 and 22 with index, for photo enlarger. Mac's Radio Service, 614 So. Michigan Ave., Stevens Point, Wis.

FOR SALE — Have gone out of radio repair business. Have equipment, tubes, and misc. parts. What are you interested in? Leland Sheldon, 1201 35th St. NE, Cedar Rapids, Iowa.

WANTED — 7" TV table or portable model in working cond. Well known make, state price, must be reasonable. Grady Mixon, Box 83, Georgiana, Ala.

SELL OR TRADE — Stamps, stamp collections, coins, ham gear, for mobile equip. Bill Grebe, 518 W. 9th, Loveland, Colo.

SELL OR SWAP — Cleveland Institute of Radio Electronics Master Course in Communications by Nilson, two sections complete. Prepares for 1st or 2nd radio phone or telegraph license. Want Radio and TV Servicing course. John Brennan, 129-36 135th Place, South Ozone Park 20, N. Y.

FOR SALE — Radio tubes: hard-to-get numbers in stock incl. 25B8. A-1 TV Service, 1198 Haddon Ave., Camden 3, N. J.

FOR SALE — Approved Electronics sig. gen., A200, $15; Heath 08 scope, $20; Heath sweep gen., TS2, $20, or will swap for Precision sweep gen. Saul Lustberg, 2333 63rd St., Brooklyn 4, N. Y.

WILL SELL — Table model Columbia Grafonolas, made by A. M. Graphophone Co., factory No. 5, plays all size records, exc. cond., $7.50 FOB. W. B. Jones, TV and Radio Service, Carnesville, Ga.

SELL OR SWAP — Robson-Burgess multitester, $10; Alexander Hamilton Institute business course, 26 bound volumes, $50, or swap for good portable typewriter. Vern Worden, Friend, Neb.

SWAP OR SELL — Heath comm. receiver in cabinet, like new, in tip-top alignment; also SW-3 with 12 coils. Need scope and freq. standard or xtal signal gen. What have you? Kenneth G. Davis, R. 4, Box 177, Annapolis, Md.

TRADE — Philco 12½" TV (needs picture tube), for scope (late Heath preferred), VOM, or sig. gen. John K. Smart, 626 Evans, Newark, Ohio.

SELL — Westinghouse dynamotor, CDH, 14 v. input, 500 v. output, .05 amps, $15; Eicor dynamotor, 14 v. input, 1000 v. output, .360 amps., $20; other surplus. J. R. Hamilton, 604 Kirkwood Ave., Iowa City, Iowa.

WANTED — Tape recorder, 6 meter converter, 152 to 174 mc. FM rcvr, '49 Olds rcvr., BVL coils. Have 35 mm Kodak, scope, xmitting gear, tubes. W. M. McDonald, 15 Joslin, Providence, R. I.

FOR SALE — Ampro tape recorder, $50; Keystone 16 mm movie projector and 3,000 ft. of movies, $35. J. Madden, 351 West 44th St., New York 36, N. Y.

WANTED — NRI Servicing Electrical Appliances course (32 lessons). William Miraldi, 84-56 86th Ave., Woodhaven 21, N. Y.

FOR SALE — Model OCA Clough-Brengle sig. gen., just overhauled at factory. Make offer. Greiner Radio-TV Service, 299 So. Elmwood Ave., Buffalo 1, N. Y.

SELL OR SWAP — NRI Radio-TV course, 100 books, less kits, and Underwood typewriter, for 10 or 12" TV in good cond., test equip., or TV booster. Emil J. White, England, Ark.

SELL OR TRADE — Model 450 multimeter, almost new, for parts and test equip. for NRI course. Joseph A. Covolo, 3823 North Sheridan Rd., Peoria 5, Ill.

WANTED — Pocket tape recorder and pocket radio. Mitchell Metzarek, 2174 Melvina Ave., Chicago 39, Ill.

FOR SALE — Riders TV manuals 1 to 14, $5 each; 1/4 hp. motors, $4 each, with bases, $6 ea.; Lysco 600, $50; Viking I (TV proof), $145; 10 and 12" TV sets, $10 to $25. C. D. Justis, 315 First Ave., Newport, Del.

SELL OR TRADE — Olympic model 8-925 AM-FM with automatic phono in console cabinet. Interested in Hi-Fi tape recorder. H. Bell, 3917 Ely Ave., New York 66, N. Y.

FOR SALE — Complete inventory of stock and equipment, valued at approximately $5,000. Forced to retire from Radio Service business. Earl Silvers, 2501 Union St., Lafayette, Ind.

FOR SALE — Record player changer, $5; '41-48 Chev. radio, $5; '42 Pontiac radio, $5; PF Index, Jan. '54 - Feb. '56, 15 late Popular Electronic, 23 Radio Electronic, 11 R&T News, all $6, plus postage. R. Chappell, 472 Elm, Biddeford, Maine.

WANTED — Complete circuit wiring diagram for Triplett model 1200A AC-DC twin meter multitester. R. M. Hendricks, 1267 No. Ulster St., Allentown, Pa.

SELL — RCA projection TV blonde console (bar or den model), 25 w. amp., fine working cond. Local or you pick up. Any offer accepted. Dick Sexton, 815 Violeta Dr., Alhambra, Calif.

SWAP — UHF channel 61 FG standard coil strips and UHF channel 61 "H" standard coil strips, for what have you? William A. Borras, 438 Laroussini St., Westwego, La.

WANTED — Seco grid leak tube tester in perfect cond. and very reasonable; also need auto radio battery eliminator. Roy Goodwin, North Dr., R. 1, Ben Hill, Ga.

FOR SALE — Unused Hamilton electronic 35 w. mobile PA amplifier (6 or 12 v. input), 2-VH-91 Bell speakers with 40 ft. cables and Shure mike. Make offer. Fred J. Klotter, 6944 West Bryn Mawr, Chicago 31, Ill.

WANT TO BUY — Riders manuals, tubes, condensers, kits, parts, cabinets, resistors, test equip., used radios. Frank Kesto, R. 1, North Rose, N. Y.

WANTED — Model 21WP4 picture tube for Philco model 51-PT1207 TV set. State price and condition. Oscar Crafton, Box 268, Belleville, Ind.

FOR SALE — Two unused DB-520 Regency boosters, and 3 Alliance Cascamatic boosters, BB2; 2 Pilotuner FM tuners. Will accept best offer. Don Brown, 108 North Plum, Havana, Ill.

FOR SALE — 15A powerstat, $15; VU meter, $10; percent meter, $3; milliammeter, $3. W. Zinsmeister, 146 North 16th St., Bloomfield, N. J.

TRADE — Master mobile mount model 132XXSSC, Advance 115 v. AC coax relay and telegraph apparatus bug, for 12 v. DC coax relay and Master mobile 20M antenna coil. Local only. Roy Firestone, 1522 Charlotte St., Bronx 60, N. Y.

WANTED — S-53A Hallicrafters receiver. Will trade issues of Railroad magazine, Radio & Television News, Radio Electronics, and others. James E. Ronan, Rt. 1, Box 1-C, Nunica, Mich.

WANTED — 75 meter mobile transmitter, antenna and power supply, any make; and 75 meter convertor for receiver. Send particulars and prices. Arthur Lowe, 1286 Ocean View Rd., Victoria, B. C., Canada.

FOR SALE — Sams Photofacts, 141, 176, 184, 194, 201 and 259, $1.25 each. Send money order. Barnetts, Inc., 308 South Main, Jonesboro, Ark.

FOR SALE — S38 Hallicrafters comm. rcvr, 1. n., $32; SW-3 National rcvr, with power supply, $20; Ampro tape recorder, $59.50. Edward Hartman, 2401 Fourth Ave. South, St. Petersburg, Fla.

SELL OR TRADE — RCA Rider chanalyst in perfect working order, probes and manual. Want famous make condenser tester or cash. Pythian Television Service, Inc., 2788 Nostrand Ave., Brooklyn 10, N. Y.

FOR SALE — Philco dynamic tester, model 7030, $25; Jackson VTVM, model 645, $25; Philco FM-AM-TV sig. gen., model 7170, $35, instruction manual. All A-1 cond., $80 takes all. Paul Monty, 89 Broadway, West Brighton, Staten Island 10, N. Y.

FOR SALE — McNabb radio control transmitter CC-I 565 mc., and Ck receiver, never used, $40 for both. Robert Schaefer, 421 East 5th St., Erie, Pa.

SELL OR TRADE — Radios, tubes, magazines, phonograph amplifiers, motors, and record changers. Ralph Miller, 7 Lorne St., Dorchester 24, Mass.

FOR SALE — Local only: Stancor P6338 and 4024; A3802 and 4210; C1362, 1080, 1002 and 2332. All for $10 or swap for Instructograph. Paul Eser, 2304 East Jefferson, Baltimore, Md.

TRADE — 1/4 hp. 110 AC motors; handmade brass carbide lite; complete welding-cutting torch; Blacksmith Forge drill press. Want 110 AC lite plant, field strength meter, tube tester, VTVM-VOM. G. L. Shriver, Rt. 1, Ridgeley, W. Va.

FOR SALE — Heath AT-1 transmitter, well built, new cond., $25, postpaid. L. M. McGee, 501 East Wyatt, Herington, Kan.

FOR SALE — Precision cathode ray tube tester CR-30, A-1 cond., $55; Heathkit condenser checker, completely assembled with test leads, $20. Don Y. Yen, 317 Northland Dr., Rockford, Mich.

FOR SALE — McMurdo-Silver 903 Absorption wavemeter, complete with all coils except #104, $8; #1619 tubes, 25c each. F. W. Marble, 5165 Harper Rd., Solon, Ohio.

TRADE OR SELL — Eico 221 VTVM in good cond., $20, or trade for Eico or equal flyback and yoke checker. A. Adams, 719 Park Ave., Williamsport, Pa.

FOR SALE — Like new condensers, tube tester, sweep gen., scope, Riders manuals, Radio and TV books. Harold Kroll, Seymour, Wis.

FOR SALE — Hallicrafters S-38-D rcvr less than year old in good cond, $40. Gary Martin, 1719 Sandwith, Canton, Ohio.

WANTED — RCA antenna coil for model 9K2 — #12879. George W. Riddle, 15 George St., Milford, N. H.

WANTED TO BUY — Dual 25 w. Stromberg Carlson amplifier or any make of comparable size. C. D. Rupp, RD 2, Kittanning, Pa.

FOR SALE — Knight 20 w. amp., $25; GE preamp $5; equalizer $5; two GE cartridges, $3 each; Jensen 15" coax speaker $25; BC-457-A converted and BC-906-D, $5 each. Robert Gossett, 15 Pine Ridge Rd., Weymouth 89, Mass.

SELL OR SWAP — Precise 610; Eico 320 changed to 322; Eico 625 tube tester. All like new. Want C-D Handicheck BF-90; Precision tube tester 612 or 654. W. C. Pope, 228 South Arlington St., Akron 6, Ohio.

WANTED — Sentinel 400A 7" portable TV. State cond., price. Hiram Desantis, 370 Verplank Ave., Beacon, N. Y.

FOR SALE — Metropolitan area only, Superior TV11, exc. cond., $30. Neil Barbakoff, 508 Thatford Ave., Brooklyn 12, N. Y.

FOR SALE — Riders Perpetual Troubleshooters manuals, 8-18 for $27.50. Frank Lev, 41-32 53rd St., Woodside, L. I., N. Y.

WANTED — Photo equip.: need Speed Graphic and 35 mm camera, enlarger, photo meter. Will buy or swap radio equip. State price and cond. Rodney Stebbing, 800 N. Harrison St., Wilmington, Del.

SELL OR TRADE — 2 Webster 78 rpm record changers, perf., one with portable case, 8" speaker, and amplifier with phone jack for external amplifier or external phono, $20 and $7.50 resp., or what have you? Elton Hoornstra, 305 Ann St., Sault Ste. Marie, Mich.

SELL OR TRADE — Unused 721 Remington 270 cal. rifle and 40 shells, 500 radio tubes, and back issues of all Mechanics magazines, 1930 to date, for test equip. N. England, 2533 Hoyt St., Muskigon Hts. 59, Mich.

SWAP — Westinghouse TV Service notes and schematics for Raleigh 903 coupons (25 coupons for one schematic). Selcraft, Box 394, Spring Valley, N. Y.

SELL OR TRADE — 25 w. class A Hi-Fi amplifier, uses 2 211 Triodes in output stage, $100, or trade for photographic equipment or comm. receiver of equal value. Al Werhan, Manlius, N. Y.

FOR SALE — Riders TV manuals 1 to 5, inclusive, like new, $45 FOB. Interested in trade for tape recorder. Nick's Radio, 169-10 140th Ave., Springfield Gardens 34, N. Y.

SELL OR SWAP — FM Pilotuner, model T601 with cabinet, in perf. cond., $30 postpaid, or swap for 8 mm movie camera. Jim Grevas, 4569 Chauteau, St. Louis 10, Mo.

FOR SALE — Dumont 164E oscilloscope, $35; 224A, $70; 100 asst. potentiometers, $10; 3 General Radio potentiometers, type 371, 50,000 ohms, $5. S. S. Brody, 211-10 73rd Ave., Flushing 64, N. Y.

FOR SALE — Transmitter, Johnson Viking II, Viking VFO, Matchbox, lowpass filter, AC line filter. Items in good cond. Philip Will, Box 205, Canal Winchester, Ohio.

FOR SALE — Unused Simpson 276 scope calibrator, $15; Eico 425 scope, in good working order, $35. David Boroff, 6051 North Talman, Chicago 45, Ill.

FOR SALE — Sams Photofacts 1-150, complete with binders; also two additional binders with 14 asst. folders. Best offer. N. Barbiere, 405 E. 182nd St., Bronx 57, N. Y.

WANTED — Tubes: Special purpose, transmitting, industrial, any quantity. Will swap for pay cash. Jack Kay, 72-36 112 St., Forest Hills 75, N. Y.

WANTED — AR-11, BC-474 or similar portable trans-rcvr covering 40 or 80. Give details and price. J. Schmitt, 85 Livingston St., Brooklyn 1, N. Y.

FOR SALE — IRE Proceedings for Feb., April, May, June, Aug., Oct., Nov., Dec. 1950; March thru Dec. 1951; Jan. thru April 1952. Harold M. Honig, 84-02 159 St., Jamaica 32, N. Y.

SELL — Mallory TV-101 UHF converter, $18; Elliott addresser, $25; misc. xmitting tubes; pair 20x50 binoculars with case, $25. Dick Rogers, 28 Bellamy Street, Boston 35, Mass.

FOR SALE — Million model XM vacuum tube voltmeter, in fine cond. Make offer. Candee Radio & Television, 321 W. Lewis St., Pasco, Wash.

WANTED — Old radio — TRF — preter horn type, separate spkr. State price, cond., and give description. H. Gehring, 1200 Stockwell Blvd., El Paso, Tex.

WANTED — Schematics or legible photostat of RCA model K-130. radio rec., tunes 540 kc., 18 mc. Edwin F. Kantz, 940 So. Filmore St., Allentown, Pa.

SELL OR SWAP — Riders manuals, 1 thru 5 abridged, 6, 7, 9 thru 14, all like new, for test equipment. What have you? Martin Feldman, 265 Cabrini Blvd., New York 40, N. Y.

SWAP — Pair of 100TH's for 12" AC oscillating fan. R. W. Heckbert, 30 Magoun Ave., Medford 55, Mass.

SWAP — Almost new Heathkit FM tuner, model FM-3, for instructograph code teacher or 152-174 mc. receiver, or good comm. rcvr. S. Gonet, 187 Conn. Ave., Stamford, Conn.

WANTED — Transmitter-receiver units, 30 to 50 mc., base station, mobile, portable, forest fire control and civil defense network, used operating condition or repairable. Priced reasonable. Frank P. Schmidt, Denmark, Maine.

FOR SALE — Precision ES500A scope, complete with SP-5 probe set, almost new with instructions, $150; CR30 cathode ray tube tester, with instructions, like new, $65. Aloys Neussendorfer, 956 Cameron Ave., Pontiac 17, Mich.

FOR SALE — Sams Photofacts from 1 thru 304. Mrs. Frances Rey, 1806 Sidney St., St. Louis 4, Mo.

WANTED — Used Blonder Tongue MA4-1 with C.S. 2 - 4 - 6 - 10, CA-1 and DA2 or DA8 strips. Must be in working order. Pennsylvania only. William B. Burd, 307 Market St., Warren, Pa.

FOR SALE — Riders radio manuals 1 thru 11, $25; Supreme 504 tube and set tester, $20; Philco sig. gen 088, $5, all in good cond.; National NC-46 Hi-Fi rcvr with speaker. Make offer. Thomas Squartino, 550 No. 7th St., Newark, N. J.

SWAP — Disc recorder playback and cutting head, no amp., for tape recorder with mike. Emory Corron, 4096 Redonda Lane, Dayton 6, Ohio.

SELL OR SWAP — Model 612 Precision tube tester, Heath VTVM, Heath RF sig. gen., and Solar condenser checker, $65, or for a television set. Verne Wilson, Mackinaw City, Mich.

FOR SALE — Riders manuals Vols. 1-5, abridged, $4.50, 6 thru 17, $3.50 each (plus postage); all 12 volumes, $30 plus shipping. Don Smith, Fruitland Park, Fla.

FOR SALE — Six-unit RCA-TV and Radio test bench: rack, test oscillator WR-67A, audio oscillator WA-54A, master volt-ohmyst WV-95A, TV sweep gen. WR-59A, and calibrator WR-39A; oscilloscope WO-55A, $495. Frank A. Merrick, 195 Cedar St., Hempstead, N. Y.

FOR SALE — Rare Edison Amberola phonograph, 31 wax cylinder records (some dated 1902), in original containers, all in exc. mechanical cond. Make offer. M. E. West, Rt. 2, Lenoir, N. C.

FOR SALE — IRE, 1945-1955; Radio News, 1929-1938; Radio Maintenance, Aug. 1946-Dec. 1948; All-Wave Radio, Short-Wave Craft, Radio Craft, Radio Short-Wave, Communication. Bremer Radio, 43 Washington Ave., Lake Hiawatha, N. J.

FOR SALE — Mallory UHF converter; Central Electronic RE-1 CRT reactivator, tester; C-D Handicheck In-ckt capacitor tester; Heath O-7 scope; Heath V-4 VTVM; Superior TV-40 CRT checker. Make offer. Ike's Radio-TV, 6655 Main St., Cass City, Mich.

FOR SALE — Jewell 0-8 v. DC meter, 3¾" round metal case, pattern 54, like new, $5 postpaid. L. Cohen, 151-09 34th Ave., Flushing 54, N. Y.

FOR SALE — GE Variable Reluctance cartridge RPX 063 with 3 mil diamond stylus for 78 rpm, only $13 prepaid. Gary Feld, 238 Naples Terr, Bronx 63, N. Y.

SELL OR TRADE — Unused RCA camera tube, type 5527; heavy-duty battery charger, up to 6 battery; Hickok 680 marker, like new. Slim's, 2025 Sunkist Ave., Waukesha, Wis.

SELL OR TRADE — 17 vols. Riders manuals in good cond., $85. Want Precision 866 VOM or RCA Chanalyst in good cond., with instructions. Brook's Radio-TV Service, 404 North 16th St., Gadsden, Ala.

SWAP — Various pieces electronic test equip. and parts, for Karlson or R-J Enclosure, good Hi-Fi speaker, FM tuner, or tape recorder. Local preferred. L. Buddine, 1700 W. High St., Haddon Heights, N. J.

SELL OR TRADE — Differential dynamic mike; handie-talkies; port. radio. Need 2- and 75-meter equip. for CAP. Leslie Harrison, 674 Palm St., San Jose, Calif.

URGENTLY NEEDED — By Sea Scouts, power supply, 12 or 24 v. input, part of Radiomarine Corp., ET 8027 marine radio-telephone. Write Ship 35, PO Box 300, Northport, N. Y.

FOR SALE — Heath Dual-Chassis Hi-Fi W-3M amplifier, best offer over $45; Heath FM-2 tuner, best offer over $20. Both in exc. cond. A. J. Tiso, 15 Pease St., Mt. Vernon, N. Y.

FOR SALE — Riders and Sams manuals and misc. troubleshooting books. Send for list and price. Jamke TV Appliance, 324 Cortland Ave., San Francisco 10, Calif.

FOR SALE — 110 v. AC gasoline-driven gen., 1500 w., 400 cy. Has 28 v. DC tap. Weight 175 lbs., practically new. R. J. Norman, 168-74 92nd Rd., Jamaica 33, N. Y.

FOR SALE — 1954 25 hp. Johnson electric starting outboard motor, like new, $325, including battery. A. Grayson, 2858 Valentine Ave., Bronx 58, N. Y.

FOR SALE — Fisher 70RT tuner $125; Fisher 50C audio control with cabinet $60; Pickering 190B arm $20; Hartley 215 speaker $40. All like new. Norman W. Tetenman, 2350 East 27th St., Brooklyn 29, N. Y.

SELL OR SWAP — Riders schematic 1 to 5 abridged and 6 to 15, all in A-1 cond., for a VM 3-speed changer in A-1 cond., or any reasonable offer. C. K. Schrader, 301 So. 18th St., Escanaba, Mich.

FOR SALE — Supreme 592 VOM $10; Supreme 599 tube checker and VOM $12; Precision 915 tube checker $25; Eico 315 sig. gen., never used, $15. Village Radio Center, 28 Carmine St., New York 14, N. Y.

WANTED — Receiver or tuner to cover 152-174 mc FM band. May be in kit form. Jim's Radio & TV, 37 Macrace, Grandville, Mich.

FOR SALE — Radio control equipment or trade for electronic key, mobile converter, mob. FM rcvr, grid dipper, etc. Andy Grant, Pineville, N. C.

SELL OR TRADE — Heath AT-1 xmtr and AC-1 coupler, 20 ft. 52 ohm coax with connectors, $40, or trade for test or audio equip. T. A. McDonald, 2682 Tremainsville Rd., Toledo 13, Ohio.

FOR SALE — UHF tuner strips Ch. 14 to 62 in types QR, R, Q and GI. Write for details. Paul Sanderson, 423 W. Vanderventer Ave., St. Louis 8, Mo.

FOR SALE — FM 5" speakers; 2 henry 70 ohm with xformer to match 25L6. Make offer. Don Furman, 37 West 53rd St., New York 19, N. Y.

WANTED — VTVM and Heath C-2 condenser checker. State price and cond. C. L. Sherwood, 137 So. Bryant Ave., Pittsburgh 2, Pa.

WANTED — Compact battery operated aircraft low freq. (190-550 kc.) or VHF (108-128 mc.) transmitter and receiver or transceiver in good operating cond. State price. Robert Q. Bannon, Glen Rd., Rt. 1, Rockville, Md.

FOR SALE — Jerrold Master system ant. amplifier, model MC-1, complete with amplifier sections for Channels 6 and 8, $75; BC-474 transmitter - receiver, $50. Williams TV, 595 Watertown Avenue, Waterbury, Conn.

FOR SALE — Two 4MF 1000 v. DC oil condensers, $5; Hammarlund 6-prong SW coils 17 to 270 meters, $3; Dunco 115 v. AC, 60 cy., 15 amp. SPST relay, $2.25. Austin Wardman, 106 Rossmore St., East Pittsburgh, Pa.

FOR SALE — Heathkit TS-1A TV alignment gen., $36; Heathkit VTVM, model V2, $24. Assembled but never used, perf. cond. Grayson Radio Electronics, 1211 W. Franklin Ave, Gastonia, N. C.

WANTED — First 10 lessons of NRI course in Radio. State price. Albert Crider, 2535 Parke St., East Gary, Ind.

SWAP — Like new: 829B vacuum tubes, BC-459-A, 7-9 mc. transmitter and 0-40 v. panel meter. Want Johnson Viking VFO, or Heathkit VF-1 VFO. Anthony J. Verboys, 224 Bradley Ave., State College, Pa.

FOR SALE — Sketchmaster for art work, Radio Handbook, Linhof camera, G.I. recorder and record changer, dynamic mike, TV books, resistors, capacitors, and radio parts. H. Cobb, Box 123, Azusa, Calif.

WANTED — For cash, transmitting tubes such types as 813, 866, 815, 829, 829B, 2E26, 2E24, 5763, 807, etc., also ham gear. What have you? Need 144 mc. rigs. Frank Scaglione, 111 Stuyvesant Ave., Jersey City, N. J.

SWAP — Disc recorder, playback and cutting head less amp., and cameras for tape recorder. Emory Corron, 4096 Redonda Lane, Dayton 6, Ohio.

FOR SALE — 9-book RCA color course, complete, $15; also DeForest's Radio and TV servicing course, complete, as is, $150. Fred Kniewaser, Alden, Iowa.

FOR SALE — Forced by illness to retire and sacrifice excellent test equip., i.e., scope, sweep gen., VTVM, flyback ckr., tube tester, many other pieces. Write for details. D. L. McCann, 11233 Lyric Lane, R. 3, Mesquite, Tex.

FOR SALE — Pair mounted B & W Balum coils, $5; unused B & W 651 Matchmaster, $30; Millen R9'er, coils for 10, 15, 20 m., $14. Paul Wunsch, Jr., 421 Clifton Ave., Clifton, N. J.

FOR SALE — HRO5RA1 receiver with band spread - general coverage coils, just realigned, $165; Panadaptor type PCA-2T-200 with spare tube, $60; General Radio 724A absorption wavemeter, 16 kc., 50 mc., $60. N. K. Stever, Box 722, York, Pa.

FOR SALE — BC-224 with pwr supply and speaker; ARC-5 xmitter; 200 mil 500 v. power supply; Hallicrafters Hi-Fi BC and amp (25 w.) and 25 w. spkr., and 78 record player. Prefer local. V. Algin, 107 Abbott St., Staten Island 5, N. Y.

FOR SALE — "Radio Maintenance," Jan. '46 thru May '51, except Feb. and Oct. '46, and Jan. '49, $5; "TV Engineering," Nov. '50 thru Aug. '53, $3. All excellent cond. Send for list of other old issues. Veto M. Traska, 3105 Bergman Street, Pittsburgh 4, Pa.

WANTED — Tape recorder, 7½/15, with pre-amp, top cond. only. Prefer part payment by top Leica Summar f.2, coated, flash. E. Mueller, 1715 East Mercer, Seattle 2, Washington.

SELL — 1250 - 1250 400 ma. xmfr.; 5 v., 60 amp. fil. xmfr.; Thordarson T19C44 choke; vacuum condensers, 50-100 mmfd; 350 w. modulation xmfr; 100 kc. xtal marker; 500 w. 10-meter coils; mike, tubes. D. Howerdel, 223 Terrace Ave., Jersey City, N. J.

SELL OR TRADE — Complete Radio-TV shop equip.; Riders 1 thru 13; Sams; Crosley, Emerson, Motorola, Hallicrafters, RCA factory data; marker and sweep gen; xtal aligner; tubes, etc. E. Lawrence, 502 East Bay, Jacksonville, Fla.

SWAP — BC-375 tuning units and loading coil; 274 Command set complete; BC-645 transceiver; BC-620 transceiver; English transceiver, like new. Want like values in press or reflex camera. Lowell Childers, 704 Buffington St., Huntington, W. Va.

FOR SALE OR TRADE — E-200-C sig. gen.; EPL battery eliminator; 7" portable TV. John G. Perkovich, R. 1, Box 150, Waldo, Wis.

WANTED — Copy of "How to Build 78 Radio & Television Sets," Pop. Sci. Pub. Co. (1950). Will pay cash. C. J. Hannel, 304 South Ivy St., Arlington 4, Va.

FOR SALE — Ham 500 w. power amplifier with T200 tube and coils for the 160-20 meter bands, $75; Pilot T601 FM tuner, $15. Both in exc. cond. Terry Carrell, 124 North E St., Monmouth, Ill.

FOR SALE — Like new Eimac .4-125 A. tubes, in sealed cartons, $15 each, 2 for $25; Kenyon T496 modulation transformer, 300 w., $20; several used 400 and 500 v. transformers, $5 each. W. T. Curtis, R. 1, Jamesville, N. Y.

SELL OR TRADE — SW-54 Nat'l receiver, and Instructograph with 6 tapes, complete with built-in oscillator for cash or will trade for FM Police Alarm receiver, ham gear. Edwin L. Sheldon, Box 721, Aberdeen, S. D.

WANTED — Planer, jointer or other woodworking tools for cash or will trade TV test instruments. Send for list. Wm. Barber, 309 Alexander St., Youngstown, Ohio.

TRADE — Little used Dumont cathode-ray oscillograph, type 208-B, for good 35 mm. MX or VX camera. Local only. Winters TV Service, 374 East 165th St., Bronx 56, N. Y.

WANTED — 8 BP4 TV tube, new or used, reasonable. Myles Suffecool, 418 Belden Ave. NE, Canton, Ohio.

WANTED — Tape recorder and test equip. Will trade radio and TV tubes. Ace TV, 5341 Cordelia Ave., Baltimore 15, Md.

SELL OR TRADE — McMurdo-Silver UHF model 700 xmitter with coils 144-148 mc., 235-240 mc.; and model 904 capacitance-resistance bridge; Precision model 920 tube tester and multimeter. C. A. McKay, 4144 Meda Pass, Fort Wayne 6, Ind.

FOR SALE — Globe Champion transmitter 165 w. fone and CW, with 80-40-20 coils, spare final tube, low-pass filter, Eldico A 300 w. ant. tuner, $250, FOB. James E. Grubbs, 208 Taylor St., Barnesville, Ga.

FOR SALE — Disposing of lab, shop, and ham equip., including Riders TV manuals, books, test equip., TV sets, parts and single sideband rig. Charles E. Spitz, 1420 So. Randolph St., Arlington 4, Va.

SELL OR SWAP — Simpson 260 VOM; Feiler signal tracer, TS-3A; Supreme 661 sig. gen.; Heath BE-2 6 v. DC supply; Hallicrafter S-38 receiver. Want tape recorder. Radio Clinic, 845 Allingham St., Van Wert, Ohio.

FOR SALE — BC-348Q converted to AC operation, complete with manual and lead phones, good cond. Leroy Singer, 4 Atwood Rd., Plainview, L. I., N. Y.

TRADE — 16" RCA TV receiver, model 6T71, with half doors and new rebuilt picture tube, tuner, flyback, and linearity coil, for a tape recorder of good make and in good cond. John Sibick, 326 Dolph St., Jessup, Pa.

FOR SALE — Unused 15 25A7 GT in boxes, $1 each; 10 25A7 G, good condition, $.50 each. H. J. Baron, 20014 Rogge, Detroit 34, Mich.

FOR SALE — Meissner deluxe signal shifter with coils, 10 thru 160 meters, exc. cond. J. P. Andrasko, 223 E. 96th St., New York 28, N. Y.

FOR SALE — Two enclosed relay racks, 66" panel space, 17" deep, with panel mounting angles 8½" from front door, $50; 4 jack panels with 48 closed circuit jacks, $24, FOB. Emil Backstrom, Jr., 6 Pell Place, Pelham, N. Y.

FOR SALE — Surplus Signal Corps transmitter model BC-223A, by Federal Tel. Co., has tuning units TU25A, TU18A, TU17A, and accessories, $75. Write for complete details. Henry Hart, 1230 Market St., Chattanooga 2, Tenn.

FOR SALE — Like new Karlson 15" enclosure blonde, Altec-Lansing 604C spkr., $20; Craftsman C400 10 w. amplifier, $20. George Ljutic, 8 Mountain Rd., Rosendale, N. Y.

FOR SALE — Riders 1 thru 10, $5 each; 11 thru 19, $7.50 each; Vols. 1 and 2 PA and 1 and 2 TV, $5 each. George J. Eckhardt, Germantown, Ohio.

SELL OR TRADE — Misc. ham and electronic gear, for what? G. W. Carter, 8015 Loyola Blvd., Los Angeles 45, Calif.

SELL OR TRADE — Raytheon voltage stabilizer, Western Elec. 141A pre-amp., typewriter, printing press, Bendix 3-way portable, Acme 35 mm. movie projector and film. E. G. Bartlett, Atlanta, Mo.

SELL OR TRADE — 125 back issues of C-D Capacitor and issues of QST, CQ, and Radio News. Alva H. Clark, Box 144, Tarboro, N. C.

FOR SALE — 2 Precision 909 VTVMs with HV probe, $25 each, 3 month warranty; sig. gen. 610A, $20; Jr. voltohmist, $20. Paul's Electronics, 4309 Kansas Ave. NW, Washington 11, D. C.

WANTED — Information concerning alignment procedure for BC-342. State price. J. Wiesemann, 1105 North 41st Street, Philadelphia 4, Pa.

WANTED — Information and technical manuals on converting BC-688A receiver and BC-689A xmitter to citizens band, 460-470 mc. O. H. Becker, 4219 W. 90th Place, Oaklawn, Ill.

FOR SALE — UTC transformers in exc. cond., at 50% off net price: LS-10, 12X & 27, A-10, 11, 12, 16, 21, 24, and 26, also PVM-1. Thomas R. Dunn, Box 105, West Scarboro, Me.

FOR SALE — Like new citizens band transceivers, FCC type approved, 465 mc., weight 4 lbs. Send for pamphlet. $119.50 per pair. Spera Electronics Supply, 37-10 33rd St., Long Island City 1, N. Y.

SWAP — Radio and TV tubes for other types. Sell Zenith TV remote control motor assembly, $4.50; American Beauty 220 v., 130 w. soldering iron, $3. John Andrews, 740 Maple St., Bethlehem, Pa.

FOR SALE — Harvey-Wells TBS-50D, APS-50 110 v. power supply, H-W VFO, Palco 6 v. DC heavy-duty vibrator pack, Gonset Tri-Band, noise clipper, coaxial relay, Master mobile mount, 75M antenna coil, 2374 kc coil. Best offer over $200. Harry E. Noyes, Box 791, Charlestown, N. H.

FOR RENT — Small service shop with living quarters in best U. S. climate. Small investment in stock. Write fully. "Radio," Rt. 1, Box 76, Elsinore, Calif.

FOR SALE — K-W transmtter. Final is 304TH in Pi-section, modulated by pair 250THs, audio and RF driven by B&W 5100 (included), TVI'd, all bands, heavy-duty pwr. supply. Best offer. J. Walker, 27 River Rd., Warwick, Va.

SWAP — Camera; .22 Remington automatic rifle; ship-to-shore radiotelephone, or cash for 115 v. AC, 60 cy. gas engine (gen. approx. 1 kw.), Onan or Kohler, etc., in A-1 cond. R. H. Ives, R2-B32, Lynnhaven, Va.

FOR SALE — Exc. cond. Hickok 605 tube tester, $80; TV test bench with variac, 4 circuit breakers, isolation transformer and strip outlets, $50. All plus shipping charges and insurance. George Miller, 251 Bonita Ave., Pasadena 10, Calif.

WANTED — "Understanding Radio" by Eby, Welch, and Watson. S. Cutler, 1954 Unionport Rd., New York 62, N. Y.

WANTED — Berlant Concertone 20-20. Will trade new Pentron T90 Pacemaker, Leica 3C, or cash. J. L. Hubbard, 2217 Ogden Ave., Superior, Wis.

FOR SALE — Test equipment: Hickok — 156 traceometer, 203 VTVM, 191X sig. gen., 650 Video gen., 600 tube tester; Triplett 3434A sweep and marker; RCA WO56A 7" scope. A-1 cond., best offer. J. W. Doud, 829 Sheridan, Salina, Kan.

FOR SALE — RME model 100 speech clipper with connectors, $25 and postpaid charges. D. F. Guptill, 17 Park St. Ct., Medford 55, Mass.

WANTED — CQ and C-D Capacitor mags prior to 1950. Will trade ham gear and military surplus. W. F. Williams, 1046 2nd Ave. So., Clinton, Iowa.

FOR SALE — Transmitter; 100 w. output Meissner signal shifter VFO; NBFM exciter; 80-10 coils, 10 crystals, your choice, $100. P. D. Boothroyd, Box 142-G, Sparta, N. J.

SWAP — 40/80 meter 40 w. CW xmitter in Bud cabinet with milliammeter, coil sets, 2 power supplies, exc. cond., for new type dial phone or phone transformer plus whatever. S. Dubov, 3100 Brighton 2nd St., Brooklyn 35, N. Y.

FOR SALE — Hallicrafter S-40A receiver, reconditioned by Winter's Lab, with 10 and 15" auxiliary speakers, $50. Earl Moore, Box 73, Radio City Sta., New York 19, N. Y.

SELL OR TRADE — Complete Radio-TV course, 118 lessons, plus 18 lessons in math., $30. Excellent condition. James J. Boyle, 60 Sherdian Ave., Albany, N. Y.

FOR SALE — Norelco TV projection system complete with yoke, lenses, CRT, high voltage supply, exc. cond., $55 crated, FOB. Inlet Electric Service, Box 115, Murrell's Inlet, S. C.

WANTED — Eico or Heathkit audio generator, kit or complete. Elmer Bensen, 1006 Prairie, Joliet, Ill.

FOR SALE — Perco FM tuner; G.I. D10 phono motor; T17 mike; 2 2J161 selsyns. John Wohlrab, 245 Parkside, Buffalo 14, N. Y.

WANTED — Viking II xmtr and VFO or equal. Will pay cash or trade Mercury Super 10 Hurricane as part payment. Johnny Johnson, 1320 No. Main, Tulsa, Okla.

SELL OR SWAP — 3" RCA scope, TMV-122-B, made in 1934, in exc. cond., for tape recorder. Have UTC PA-4L6, same as CG-4L6, $8; tubes: 304TL $4, 810 $5, 250TH $7, 100TH $5. All like new. Macy, 2346 Dundee Rd., Louisville, Ky.

TRADE — 5BP4 cathode ray tubes, for 3BP1. Robert A. Lebowitz, 1890 East 5th St., Brooklyn 23, N. Y.

WANTED — Hickok tube tester; tape recorder; communications rcvr.; TV test equip.; odd copies of Sams manuals or CQ magazines. Wood Radio & TV Service, 213 Springer Dr., Coraopolis, Pa.

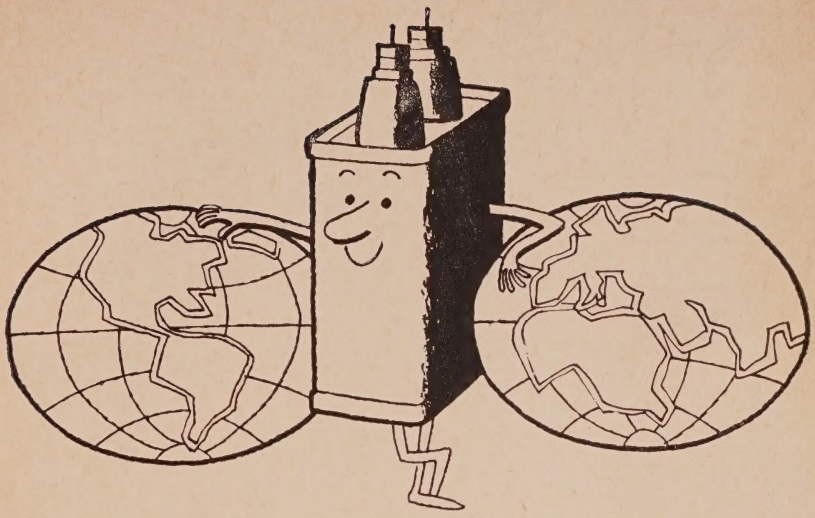
FOR SALE — Oscilloscope 5" Heath, model 0-6, like new, $30; signal tracer Heath T-2, $12. F. Jenney, Coggeshall Ave., Newport, R. I.

FOR SALE — Navy surplus Snooperscope, like new, $150. Need mirror scale meters or coil winder. Donald Pallatz, 2518 Coney Island Ave., Brooklyn 23, N. Y.

FOR SALE — Precision 900 tube and set tester, exc. cond., $18 FOB. Stanley Gale, 223-54th St., Brooklyn 20, N. Y.

URGENTLY NEEDED — Navy selsyns or synchros, sizes 1, 3 and 23, also transmitting tubes. Advise price, cond., and manufacturer. Albert L. Berg, 50 Eastern Ave., Boston 13, Mass.

FOR SALE — BC-312-N receiver with AC power supply, $35; Leece-Neville alternator with rectifier, and voltage regulator, best offer; Norelco TV projection unit, 3" tube, $25; RCA 3" scope, $35. Eugene Adams, 755 Delafield Avenue, Staten Island 10, N. Y.



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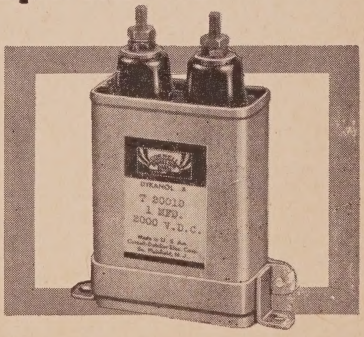

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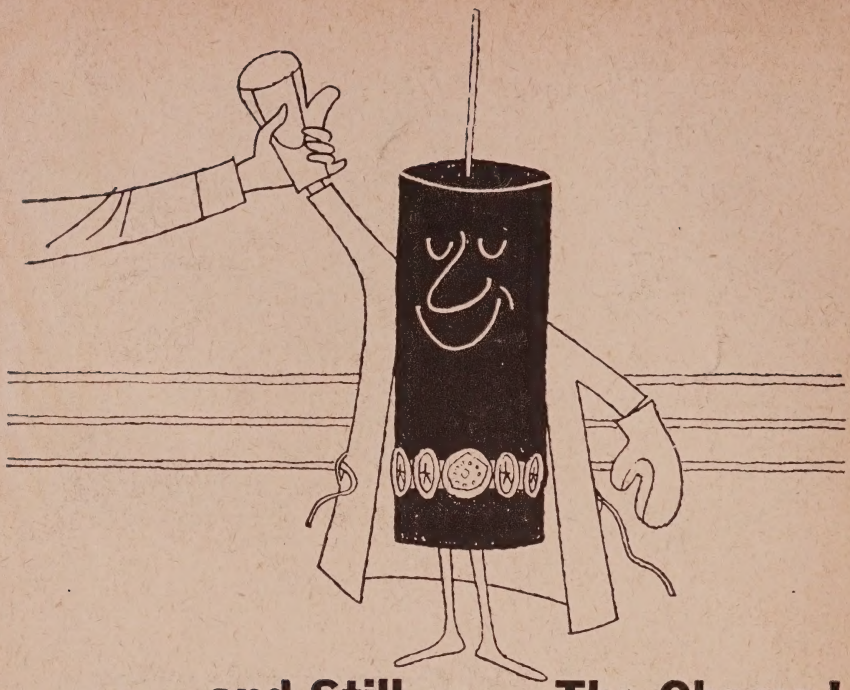

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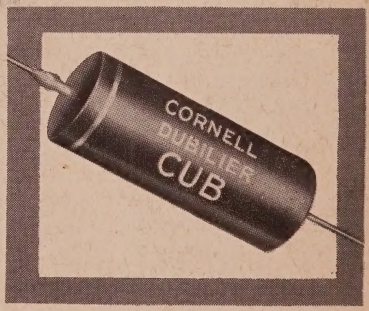

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